INVESTIGATOR'S ANNUAL REPORT

United States Department of the Interior

National Park Service

All or some of the information you provide may become available to the public.

OMB # (1024-0236)
Exp. Date (11/30/2010)
Form No. (10-226)

Reporting Year: 2010	**Park:** Shenandoah NP	**Select the type of permit this report addresses:** Scientific Study

Name of principal investigator or responsible official: Megan Paustian	**Office Phone:** (240)350-6388
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Additional investigators or key field assistants (first name, last name, office phone, office email)
No co-investigators

Project Title (maximum 300 characters):
A Molecular and Ecological Survey of the Philomycidae in South-Central Appalachia

Park-assigned Study or Activity #:	**Park-assigned Permit #:**	**Permit Start Date:**	**Permit Expiration Date:**
SHEN-00380	SHEN-2010-SCI-0013	May 20, 2010	Dec 31, 2011

Scientific Study Starting Date: May 20, 2010	**Estimated Scientific Study Ending Date:** Dec 31, 2011

For either a Scientific Study or a Science Education Activity, the status is:	**For a Scientific Study that is completed, please check each of the following that applies:**
Continuing	__ A final report has been provided to the park or will be provided to the park within the next two years __ Copies of field notes, data files, photos, or other study records, as agreed, have been provided to the park __ All collected and retained specimens have been cataloged into the NPS catalog system and NPS has processed loan agreements as needed

Activity Type:
Research

Subject/Discipline:
Animal Communities / Wildlife

Purpose of Scientific Study or Science Education Activity during the reporting year (maximum 4000 characters):

The Philomycidae are a poorly-known group of terrestrial slugs native to North America, with peak diversity in the south-central Appalachians. During field excursions across the region, I intend to fulfill several objectives:

â ¢ To collect philomycid specimens widely to contribute to their molecular tree.

â ¢ To add to the known range of each species.

â ¢ To survey philomycid habitats across diverse environments to determine which habitat characteristics (niche dimensions) distinguish species.

â ¢ To study philomycid diet by analyzing their feces.

â ¢ To undertake two side projects:

o a photographic and ecological survey of slugs in the south-central Appalachians to post to the Encyclopedia of Life (EoL).

o a survey of nonnative slug distributions.

In Shenandoah National Park, I sought to cover a wide area to survey as many as possible of the seven potential species known from the park.

In the future, I intend to use the molecular and range data in an anticipated post-doctoral project. The ecological niche data will enable me to form hypotheses to better understand the ecological circumstances of philomycid evolution and dispersal.

In the face of environmental degradation and climate change, the family is also in dire need of further study: undiscovered cryptic species are highly probable, and the habitat requirements of small-range endemic species are unknown.

Findings and status of Scientific Study or accomplishments of Science Education Activity during the reporting year (maximum 4000 characters):

I conducted multiple surveys alongside permitted park trails and at roadside stops, including a diverse set of habitats throughout the park. I visited thirteen sites throughout the park during 5/24/10-5/25/10. I sought exposed, active slugs and overturned decayed logs to find them. I collected observations on 23 slugs belonging to four morphospecies. I photographed each slug, measured its length, and noted substrate and behavior. Eight slugs of four morphospecies were collected as voucher specimens for ID confirmation and molecular analysis. After a period of observation and photography of the live animals, they were placed in 70% ethanol and a subsample of tissue was placed in 97% ethanol. At each site, GPS coordinates, elevation, and habitat characteristics (vegetation composition) were recorded. I collected feces from ten slugs of four morphospecies to analyze diet. Feces were gathered from collected voucher slugs and incidentally as encountered on the bodies of slugs in the field. Invasive slugs (Arion subfuscus) were observed at three sites.

I plan to undertake data analysis this year. I will assign species to morphospecies through dissection. The habitat characteristics associated with species localities will be derived from existing spatial datasets through DIVA GIS. I will send tissue samples to colleagues for molecular analysis. Once species identities are assigned to morphospecies, I will prepare material on slug species for the parkâ s website and fill out collection data sheets. If time allows, I may return to the park to survey additional localities.

For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?
Yes
If "Yes", identify where the specimens currently are stored:
Carnegie Museum of Natural History (my workplace)

Funding specifically used in this park this reporting year that was provided by NPS (enter dollar amount):	**Funding specifically used in this park this reporting year that was provided by all other sources (enter dollar amount):**
$0	$0

List any other U.S. Government Agencies supporting this study or activity and the funding each provided this reporting year:

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Resources (3127 MIB), National Park Service, 1849 C Street, N.W., Washington, DC 20240.